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THE AEROVOLT.

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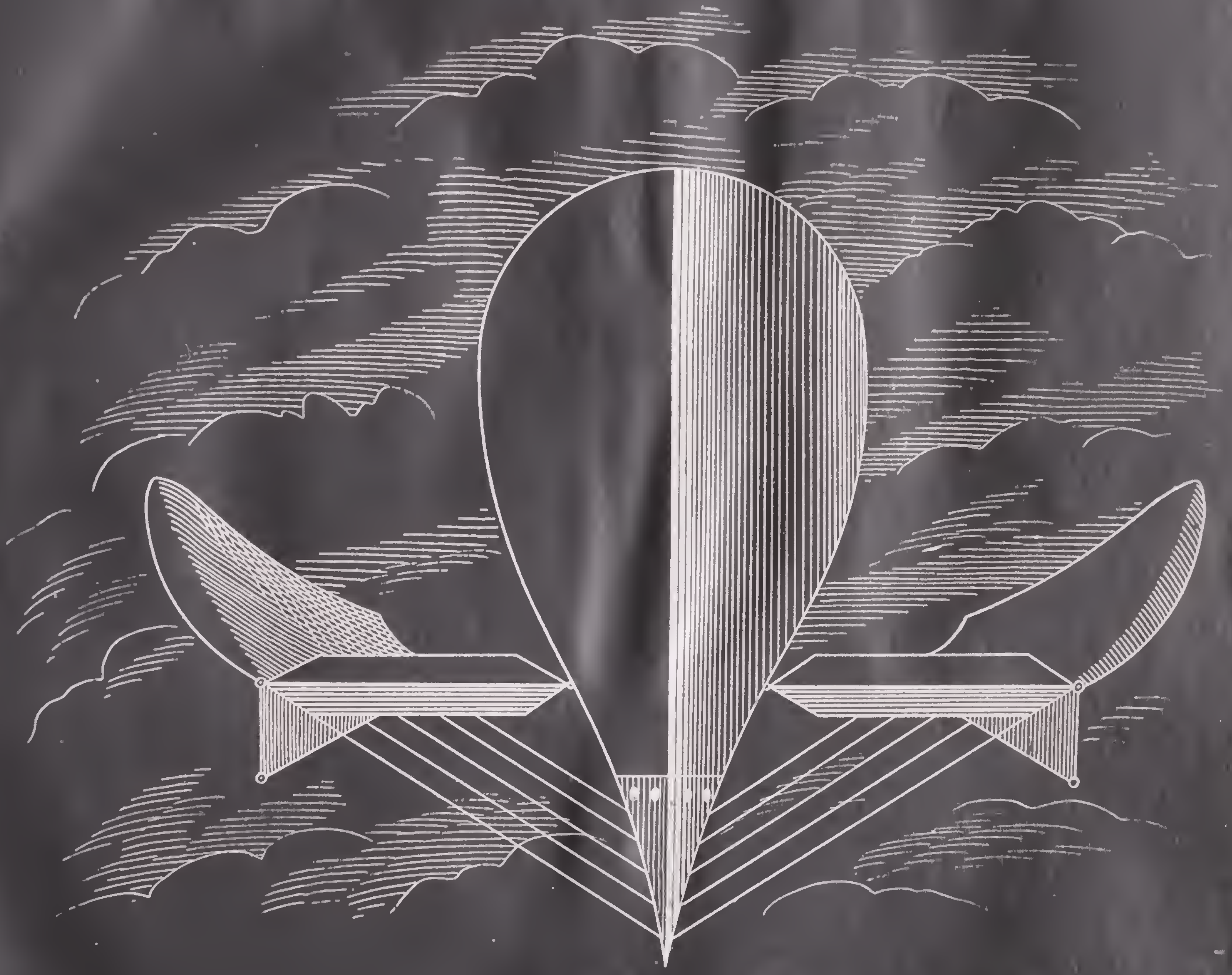

A Ship without Engine, Screw, Paddle, or other Mechanical Appliances, yet capable of travelling at a speed greater than that of a Railway Train. Its Motive Power being its own Weight; its form its only Engine.

It will carry Passengers with Safety and Comfort in a direct line to their destination, over Land or Water, at an expense of less than one sixth that of Railway Travel.

It will traverse the Atlantic in thirty hours (less or more), and no place on this Earth's surface is inaccessible to it.

It is Patented in all Civilized Countries, and will constitute a centre of interests of enormous magnitude.

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THE AEROVOLT.

The only real obstacle to the navigation of the air has existed in the inability of any known Engine driven by any known power to raise and propel itself through the air; and if floated by other means (such as the buoyancy of gas), to propel itself, together with such means of flotation, at a speed greater than five or six miles to the hour, a pace totally inadequate to the practical navigation of the air.

The Aerovolt rises superior to these obstacles; she herself is her own engine, her own propeller; and, although she possesses no moving parts, she travels quick or slow, at her pilot's wish. Her motion, exactly the same as the gliding of birds, is produced by the resistance of the air acting upon ascending or descending inclined surfaces, the power used being gravitation.

SPECIFICATION.

As previously stated, the motive power is the resistance of the air against descending (or ascending) obliquely inclined surfaces, imparting to said surfaces an onward oblique gliding motion in the direction of their inclination, the motion being therefore a compound forward and downward or forward and upward one.

Three factors are necessary to the production of such motion:

An Inclined Surface.
The Resistance of the Air.
A Power of Ascent and Descent, vertically.

The Aerovolt is constructed in such a manner as to present as large an amount as possible of upper and under surfaces, and as small an amount as possible of end surface, opposing thereby to its vertical motion the greatest possible resistance, and to its motion endwise the very least.

To such a vessel, supplied with the necessary power to raise or depress it at will, the diagonal motion before mentioned is given by tilting it so that its longitudinal axis is out of the horizontal plane, presenting in this way its large *surfaces inclined* to the air opposing its upward or downward movement, thus causing the *resistance of the air* to force the vessel onward as desired.

In order to proceed for a distance in this manner (which is similar to the tacking of a ship, except that the motion is in a vertical instead of a horizontal plane), the vessel must be caused alternately and continuously to rise and fall, which can be effected in various ways; the simplest and most efficient, however, is to construct the vessel with chambers arranged on the upper part of a platform and charged permanently with pure hydrogen, and of such capacity that when half full their power of ascent will be sufficient to balance the weight of the whole vessel, with cars, freight, etc., less a certain proportion called the "driver." This weight represents the *power of descent*, gravitation being the active agent.

To procure the necessary ascensional force another chamber is provided, charged with suitable gas, heated air, steam, etc., in which is generated sufficient buoyancy to raise the "driver," and as much more as may be desired in addition. This additional buoyancy represents the *power of ascent* (which is withdrawn when descent is desired).

For better comprehension of the foregoing, reference must be had to the annexed drawings.

Fig. 1. Perspective view.
" 2. Underneath.
" 3. End.
" 4. Section.
" 5. Passenger car.
" 6. Interior of passenger car.

A is a platform frame, or wings (its normal position being horizontal), constructed in such a manner and of such materials as will combine the greatest degree of strength and lightness.

K is a vertical frame, kite shaped, attached to A, and made perfectly rigid and strong.

B B^1 B^2 are permanent gas-chambers divided into compartments C and C^1, braced together and secured to frame A. They are arranged so as to form channels for the air, thereby presenting more resistance than would a simple plane, and securing a perfectly smooth and steady motion.

I is a supplementary or expansion chamber, or chambers, suspended from frame A attached to frame K, constructed so as to expand when inflated, to supply the power of ascent.

This chamber can be charged with hot air, with ammoniacal or other gas, or preferably with steam, a constant supply being given while ascent is desired. Said gas or steam is condensed when descent is necessary, the liquid being received into receptacles provided for it, and fed again into the boiler.

(Five thousand pounds of water (being about 80 cubic feet) are sufficient, when converted into steam, to lift a weight of more than 10,000 lbs., which is more than double the power of ascent needed for an aerovolt 500 feet long, transporting 100 passengers and 15,000 lbs. weight of freight. One cubic foot of water converted into steam displaces 1696 cubic feet of air, affording an upward force of about 140 lbs. The weight of chamber and water being sustained by the permanent upper chambers, the ascensional force thus generated by the steam is of course a clear gain.)

D is the working car containing the boiler or boilers, the fuel, reservoirs, etc., constructed fire-proof. Said car is entirely isolated from any chambers containing inflammable gas or material, it is rigidly secured to frame K, and from it is the working of the whole vessel controlled.

Should any auxiliary means of ascent or descent or of propulsion be desired, such as screws, wheels, paddles, etc., they can be driven by the steam from the boiler before letting the same escape into the chamber I; but it may be found that such means will neither be necessary nor useful, the speed of the Aerovolt from its gliding motion being so great as to render such devices an obstruction rather than a help, on account of the opposition presented by their surfaces to the resisting air, and because of the extra weight of the engines they would make necessary.

E is the car for passengers, mails, and baggage suspended from frames K and A. (The car in Figs. 5 and 6 is 300 feet long and 20 feet diameter, accommodates 100 passengers and 15,000 lbs. of baggage and mails; it is carried by an aerovolt 500 feet long.)

In Fig. 6, A is the dining-room, 50 × 20 feet.
B, parlors, each 40 × 20 feet.
C, kitchen.
D, store-rooms.
E, mails and baggage compartments.
F, state-rooms, each 8 × 6 feet.
G, toilet-rooms.
H, office.
I, bar-room.
J, smoking-rooms, etc., 30 × 20 feet.
K, promenade deck, covered, 100 × 20 feet.
L, fore and aft lights.
M, water compartment.

Means of communication are provided between this car and the working car D and between this latter and the platform A by stairs or ladders. Telephone communication is also provided throughout the two cars.

The passenger car may be so arranged that on arrival at its destination it can be detached from its points of suspension and another attached in its stead for an immediate return trip, thus avoiding delays and keeping each aerovolt in constant use.

F is the tilting weight suspended from car D, or from car E, if preferred. It is used by the pilot to give the Aerovolt the requisite inclination, the angle of which is indicated by a pendulum (other devices, however, are more suitable in practice).

In surveying, exploring, or when used for purposes of war, the car E may be replaced by more suitable vessels, with their supplies, men, stores, etc.

G are sails attached to platform A, supported chiefly by the chambers B, having a light boom, M, secured to the lower part, and a weight, H, designed to keep them sufficiently distended not to be thrown in toward chamber I, when beginning the descent. Their lower edges are secured by lines to car D. These sails serve to confine the air to the channels W′.

The construction of the Aerovolt is such as to avoid all local or partial strains, the whole acting in unison to render it a perfectly strong and safe structure.

The loss of weight occasioned by combustion of fuel is counterbalanced by letting gas escape from the lower middle compartment of chamber B′, and also by the extra size of chamber I.

Any ordinary steering device may be employed; but, to avoid the retarding action of a rudder, and for other considerations, we purpose employing a current of air, which, by being ejected from either side at points near the bow or stern, or both, will have the effect of causing her to deviate towards the right or left or to turn upon her centre as rapidly as may be desired.

Although we have shown but a few styles of aerovolt, it should be understood that the form of such vessels may be very varied.

SAFETY.

The air ship of the past presents a fearful record of disasters. The aeronaut after quitting *terra firma* is at the mercy of the winds. If the weather remain fair and favorable his chances of returning to earth in safety are good; but should it become at all boisterous, they are bad in the extreme, solely because his air ship—the well-known balloon—is the toy and sport of the air. Make it a controllable thing, one that can travel and be guided to any point, and the conditions are immediately changed. In the Aerovolt the traveller is no longer at the mercy of the winds; he is master of his only great enemy, which, being conquered, becomes his truest and best friend, helping him along on his journey in most cases, and when adverse retarding him but little. Other dangers, that are common to her as to other structures of man's contrivance, are so few and so easily guarded against that our Aerovolt may be said to be danger-proof. Her boiler might explode, but the danger of such an accident would, in her, be reduced to a minimum; the effect, at the worst, would be to cripple the craft. The force of the explosion would find vent in every direction, and might destroy a few of her gas cells, so bringing the vessel to earth, but, with her comparatively small boiler, constructed of the best material and workmanship, and managed by men of intelligence, with the full knowledge now possessed of the nature of steam, this accident is a most unlikely one.

The fires are contained in fire-proof compartments, as is also the fuel; none ever coming in contact with any inflammable material. The gas chambers are completely out of reach of any fire whatever; the passenger car and chamber C are of fire-proof materials, and it is an absolutely impossible thing to set fire to the Aerovolt from either car D or E.

She is proof against collapse because of her cellular construction. Her chambers are made of ample capacity to allow for expansion of the gas during ascension; and, again, they are made in so many compartments that one, or even several, might collapse without at all imperiling the whole structure, just as is the case in a ship built in compartments. Her other dangers are none. She has no storms to contend against, as has a ship on the ocean; no lee shore; no sunken rocks or ice-floes. Her danger of collision is at present *nil*, but when the air will be alive with aerovolts such danger will be but one to one hundred when contrasted with the same risk to vessels on the water. Whilst the vessel on the water has but the power of passing a vessel on an opposite course by keeping to the right or to the left, aerovolts can avoid each other by gliding below or above or passing at any point to the right or left. To contrast her chances of safety with the risks and dangers of railway travel, so very and so sadly familiar to most of us, we deem unnecessary.

SPEED.

The speed of the Aerovolt will be governed by the incline given to the vessel, the weight or buoyancy of the driver, and the extent of surface opposed to the resistance of the air during her upward and downward movements. Placed in a perfectly horizontal position, her motion, whether upward or downward, will be extremely slow, because of her very extended surfaces; brought to as great an angle of inclination as her construction will allow, her motion will be extremely rapid. It remains, therefore, but to regulate the angle of incline and the weight of the driver to get up the speed desired. This angle of incline will at no time be so great as to at all inconvenience the passengers. It need never amount to as much as is experienced on a ship at sea, in which the changes are incessant, whilst in the Aerovolt the motion is at all times smooth and gentle.

Our experiments made with an aerovolt of 50 feet length gave a speed of over 22 miles in 23 minutes, in still air (distance being measured on a horizontal plane). An aerovolt of 500 × 150, properly built, with a sufficient driver, will travel at a rate of over 50 miles per hour.

COMFORT.

Where is the traveller who has not suffered from the atmosphere of railway cars, charged with dust, smoke, and sulphurous gas, aggravated by the discomfort of a cramped position, the jarring, the shaking, the noise, the hurried, half-digested meals, the monotony of a scenery composed of rocks, trenches, banks, and tunnels, the only relief being an occasional glimpse of the green fields seen through a blinding smoke.

Travel by water would be tolerable were it not for the constant pitching and rolling, and the close atmosphere of even the cleanest cabins, caused by the heated oil of the machinery, the emanations from the coal, the cargo, and the damp hold, all contributing to produce or to intensify that most dreaded and terrible malady—*sea-sickness.*

The Aerovolt possesses a passenger-car wherein none of the above-named disagreeables exist; it is clean, airy, no smoke, no dust, no noise, no crew to intermix with passengers, roomy dining-room, parlors, and cabins; the purest of air permeates the whole, and its motion is perfectly smooth, easy, free from oscillation, jarring, or shaking of any kind.

The incline of 2, 3, or even 4 inches to the foot has nothing disagreeable about it, being steady, and changed no more often than four or five times every hour: it is much less than the incline given to vessels by very moderate waves.

The view from lofty elevations will be grand and exhilarating beyond conception.

FINANCIAL.

Its financial aspect is one of boundless magnitude, inaugurating a new field for business enterprise, and offering to capitalists a rare opportunity for extensive and successful investments.

In the earlier days of aerial travel, the transport of passengers, mails, and important freight will afford very remunerative business to the first established companies. Later on, when competition will be possible, its area of usefulness will be extended until the air will teem with aerial craft bound on errands of pleasure and usefulness, as the waters of our harbors now teem with their steamers, ships, boats, and barges.

The subjoined remarks from the pen of Mr. E. C. Stedman, copied by permission from *Scribner's Monthly*, present a foreshadowing of some of the many changes to be wrought by the instrumentality of our practical aerial traveller, THE AEROVOLT.

To offset the discouragement resulting from previous failures, remains the undeniable statement that there is nothing in nature against the solution of the aëronautic problem. It involves no *reductio ad absurdum*, requires no new and undiscovered principle. It is purely a mechanical problem—demanding new mechanical combinations, an advance in control of mechanical power, possibly an increase in the production of certain materials, certainly a novel constructive ingenuity. The problem can be solved, and at this stage of civilization should be treated no longer with cowardice or contempt.

Suppose the conquest of the air to be achieved, its secret found; suppose that men were free to have their will of it.

Result—freedom, illimitable freedom; freedom of movement, government, thought, of life in its widest possibilities and boundless range. A race must attain majority to have the skill for such a conquest, and with majority comes the right to such freedom. Earlier, it would be a fatal gift.

"What," I often ask, "will be the first and obvious effect of aërial navigation?"

To many answers, apposite or otherwise, I have added my own:

"Decatur, Illinois, will become a sea-port town."

"How a sea-port town? And why Decatur?"

Why Decatur, to be sure, more than other city, or, indeed, any desert oasis or mountain peak? I say Decatur, because that place will do for an example of the dependent inland towns, impossible before the building of railways, inaccessible except for their construction. The smallest, the most remote, of them all will at once become sea-ports. The air will be the ocean; or, rather, let us say, that ethereal ocean, the atmosphere, at last having been utilized and made available for the commerce, the travel, the swift running to and fro of men, every spot of this globe will be a building-site, every acre a harbor, every open space, plain, hummock, the highest range, the humblest valley, an aërial port.

The Irishman then will not be called upon to admire the foresight of Providence in making great rivers flow by mighty towns. Air communications will be everywhere. The second effect, then, will be that our overgrown cities must relinquish their importance. Such "necessary evils" must even cease to exist, except for advantages gained by centralization here and there, for purposes of education, luxury, or governmental power. The instant these purposes shall be satisfied or abused, a growing city will cease to grow.

This, also, is in the direction of freedom. New York no longer will be the metropolis, St. Louis and Chicago no longer the West. Paris no longer France. The rural places—even the isles of the sea—will emancipate themselves from the centres by union with the whole. They will cast off the repressive influence of the former, and interchange their thought with the ideas and glory of the world at large.

Heavy freights must long continue to move by water and rail. Aërobats at first will be used for the transmission of the mails and light express packages, and especially for their swift conveyance over sea. Soon the inland companies will have each its own "aërial express." By and by aërobats displaying the insignia and pennons of the great newspapers will leave town at 3 A.M., and whir over the country "as the crow flies," and at their utmost speed, dropping their packages in the towns and villages along the routes in every direction of the compass. Soon the more adventurous and resolute, and finally all classes of travellers, will avail themselves of the great passenger aërobats and enjoy the unsurpassable luxury of flight, experiencing thrills of wonder and ecstasy, and a sense of power, freedom, and safety to which all former delights of travel may well seem tame by comparison.

Science will make instant and brilliant use of the new means at command, and economy, political and domestic, will adjust itself, with the aid of science, to the new conditions. Our standards will be revised, meteorology will receive intelligent and close attention; a class of astronomical observations will be made at will above the vapors of the lower atmosphere; the Pole, the desert, no longer can hide their secrets from the geographer; the geologist will explore formations hitherto inaccessible; the telegraph will be put to new uses; in numberless directions the sum of human learning will be advanced.

New processes of mechanical and manufacturing industry will arise, often utilizing material hitherto worthless. We shall have ceaseless invention of aërobatic appliances and improvements, and of the machinery to make the same. The impetus that will be given to the industry as to the commerce of the world cannot be overestimated. A *finesse* will characterize the new manufactures beyond anything previously known, and only suggested by the elegant adroitness of the races which people the Asiatic coast. Human skill will expend itself upon new combinations of grace, lightness and strength in machinery and equipment.

Not only by these processes of construction, but also by the power and freedom gained through their success, a delightful reflex influence will be exerted upon the æsthetics of life. Poetry and romance will have fresh material and a new *locale*, and imagination will take flights unknown before. Landscapes painted between earth and heaven must involve novel principles of drawing, color, light and shade. Music, like the songs of Lohengrin, will be showered from aërial galleys. In every way the resources of social life will be so enlarged that at last it truly may be said, "Existence is itself a joy." Sports and recreations will be strangely multiplied. Rich and poor alike will make of travel an every-day delight, the former in their private aëronons, the latter in large and multiform structures, corresponding in use to the excursion boats of our rivers and harbors, the "floating palaces" of the people, and far more numerous and splendid. The ends of the earth, its rarest places, will be visited by all. The sportsman can change at pleasure from the woods and waters of the North, the runways of the deer, the haunts of the salmon, to the pursuit of the tiger in the jungle or the emu in the Australian bush. An entirely new profession—that of airmanship—will be thoroughly organized, employing a countless army of trained officers and "airmen." The adventurous and well-to-do will have their pleasure yachts of the air, and take hazardous and delightful cruises. Their vessels will differ from the cumbrous aërobats intended for freight and emigrant business, will be christened with beautiful and suggestive names—Iris, Aurora, Hebe, Ganymede, Hermes, Ariel, and the like—and will vie with one another in grace, readiness, and speed.

Observe also the swift advance which, from the nature of things, aërial navigation will effect in the science of government, and especially in the co-relations of the nations and peoples of the world. Boundaries will be practically obliterated when mountain-chains, rivers, even seas, can be crossed as readily as a level border-line, and oppose no obstacle to the passage of travellers, merchants, or men-at-arms. Laws and customs speedily must assimilate when races and languages shall be mingled as never before. The fittest, of course, will survive and become the dominant types. The great peoples of Christendom soon will arrive at a common understanding; the Congress of Nations no longer will be an ideal scheme, but a necessity, maintaining order among its constituents and exercising supervision over the ruder, less civilized portions of the globe. Free-trade will become absolute, and everywhere reciprocal: no power on earth could enforce an import tariff. War between enlightened nations soon will be unknown. Men will see "the heavens fill with commerce," but after a few destructive experiments there will rain no

"—ghastly dew
From the nations' airy navies grappling in the central blue."

Troops, aërial squadrons, death-dealing armaments will be maintained only for police surveillance over barbarous races, and for instantly enforcing the judicial decrees of the world's international court of appeal. Ultimately knowledge will be universally distributed, the purest and most advanced religion will shed an influence everywhere, and its gospel indeed be preached throughout the world and "to every creature."

The morning of a Saturnian age thus will dawn with the success of man's attempts to navigate the atmosphere. Sit down, separate yourself from the thought of things as they are—speculate freely, but with sound imagination, upon what they may be—and by irrefragable processes of logic you will see that what I predict must result from the solution of our problem, indeed that the half has not been suggested. The law is well understood: material progress determines the intellectual and spiritual progress of the human race. Its true perfection must follow this ultimate conquest of nature, and can be reached in no other way.

Have any commensurate efforts yet been made to achieve this result? Has it been considered otherwise than as a fantastic dream? Have any, save a few enthusiasts, mostly poor and unlearned, attempted to realize it? Is it not left, even now, to the accidents of time? Still, there is nothing yet undone but man desires to do it. His unrest, his eager insatiate daring, penetrates the heart of Africa, the depths of the seas. Visionary speculators waste fortunes upon impossible motors, upon luckless wells and mining-shafts, while here is the most tempting of all material achievements demonstrably within the bounds of invention, within the capacities of forces and matter already under our control. The determined effort, the liberal expenditure of a single government, even of one of our thousand moneyed corporations, can solve the problem. It is strange that a score of such efforts, of such expenditures, are not making; that the princeliest appropriations, the deftest intellects, are not devoted to the attainment of this end. But with or without them, I repeat, the end is near at hand.

THIS important invention is covered in all civilized countries by patents, the property of LEGGO & CO., under the style of "THE UNIVERSAL AERIAL NAVIGATION COMPANY," from whom International Routes, National Lines, and other privileges, may be secured for duration of patents, or for a specified time. For further particulars and explanations apply to

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EXEMPTIONS.

Special Contracts will be made conferring rights and privileges, entirely free, to Companies or responsible parties desirous of using our invention for Scientific purposes or Exploring expeditions.

Should the Press of New York, or of London or Paris, or of any other large centre of population, combine to construct Aerovolts for the distribution of their newspapers and periodicals, they too will be exempt from Royalties.

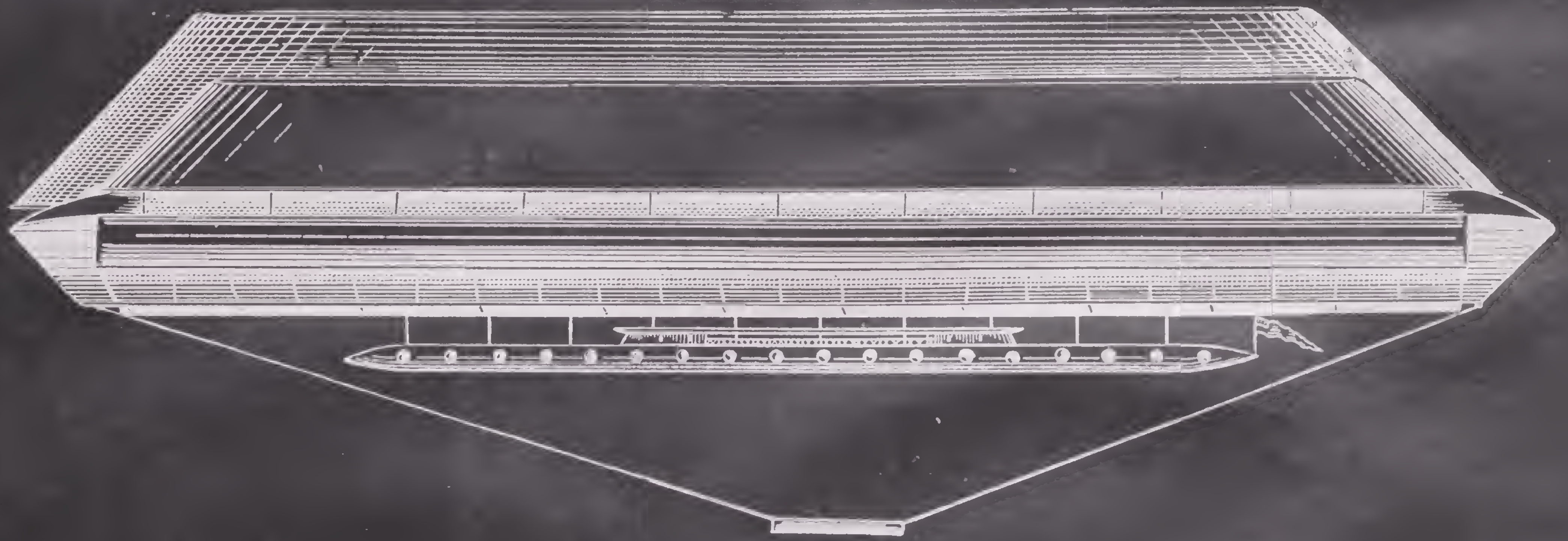
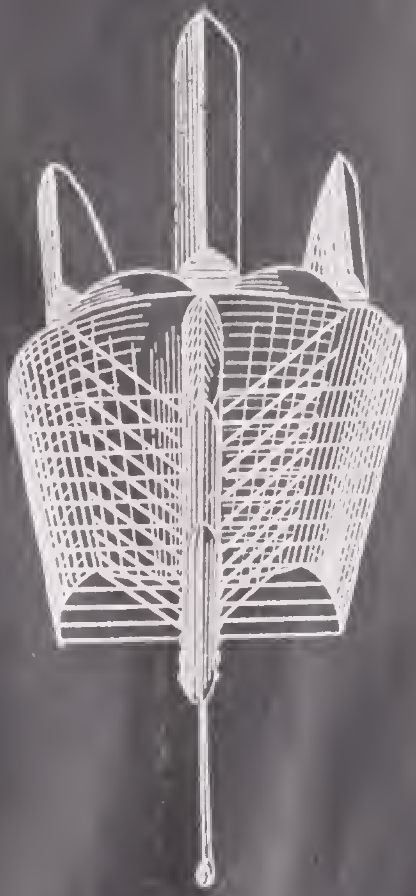


Fig. 1.



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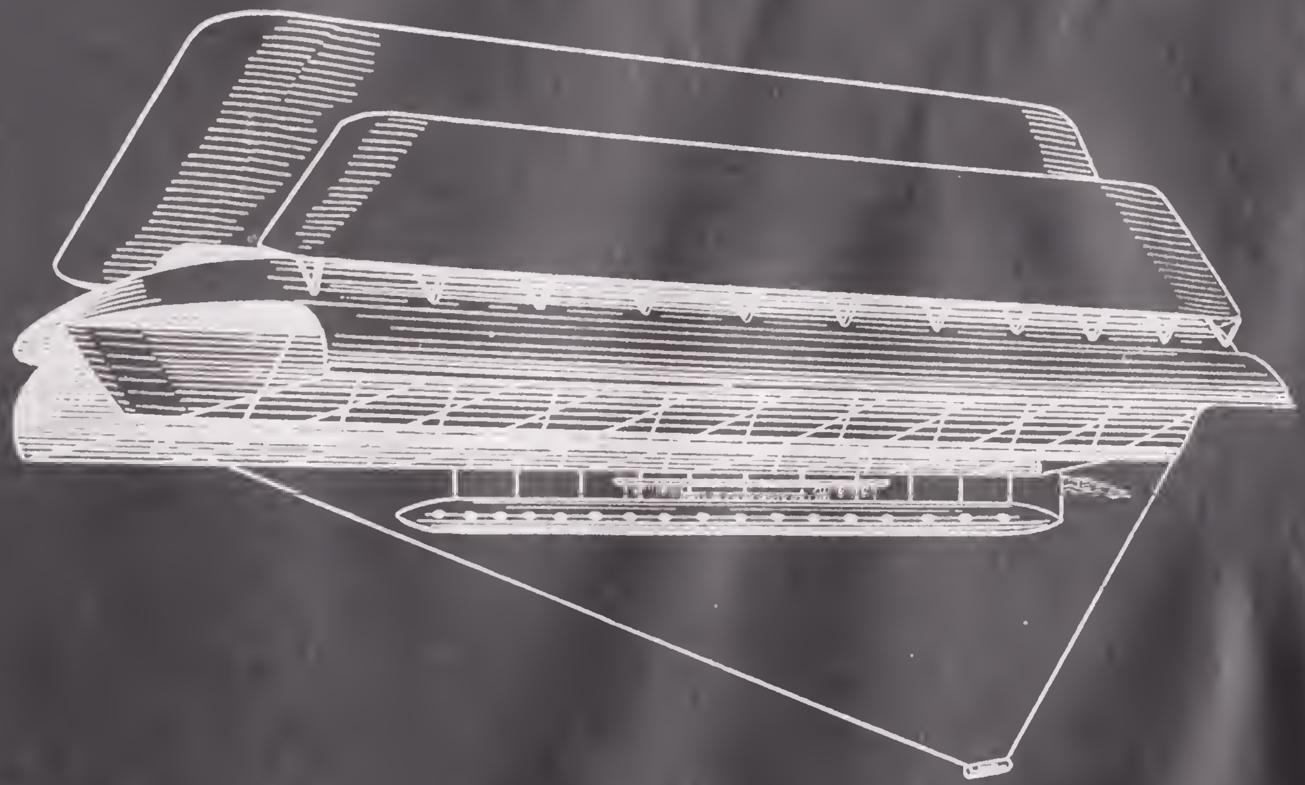

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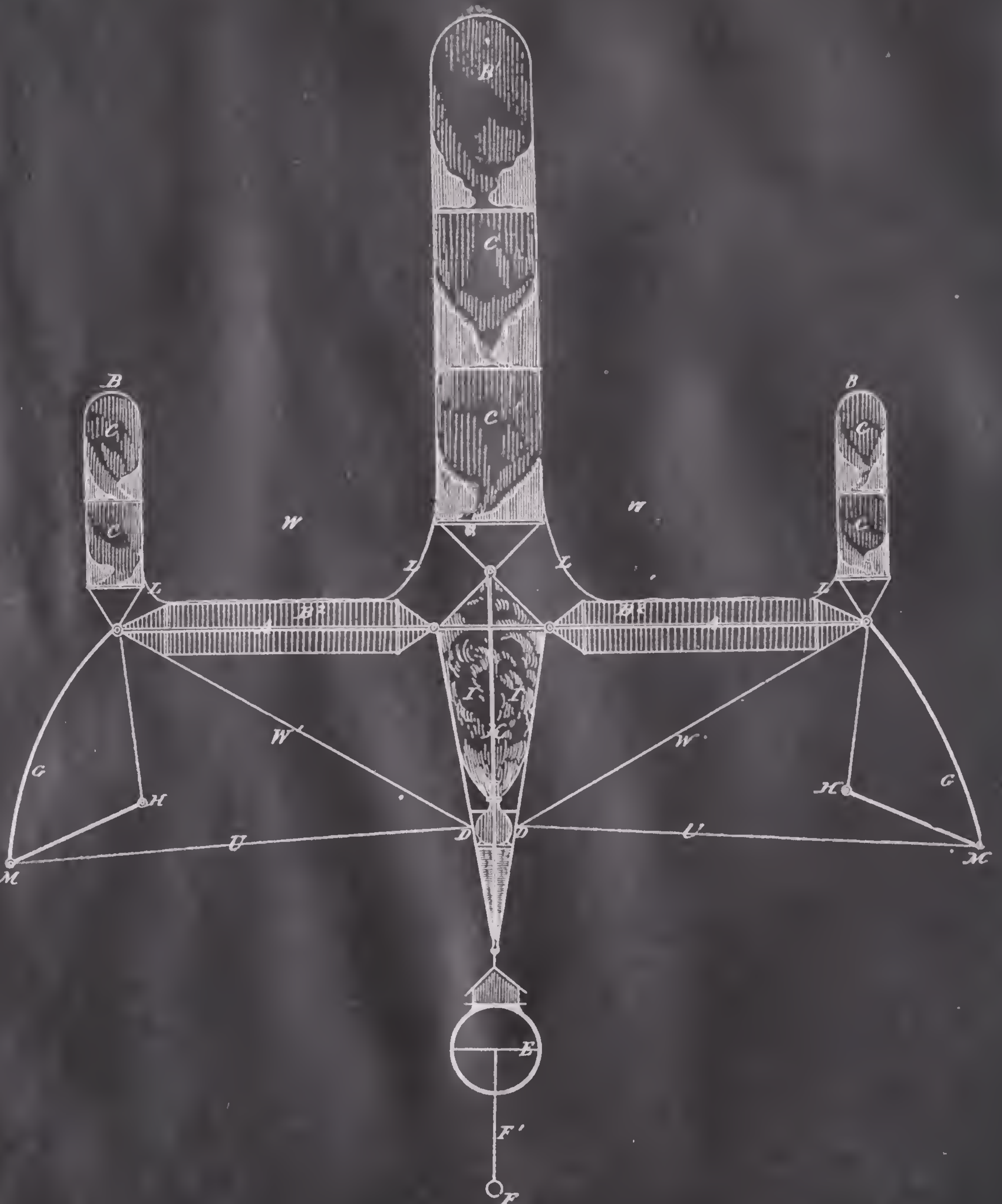

Fig. 4.

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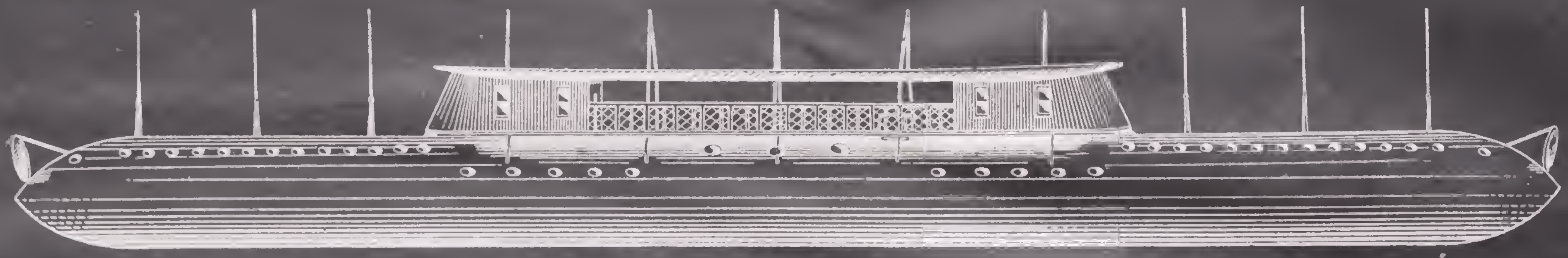


Fig. 5.

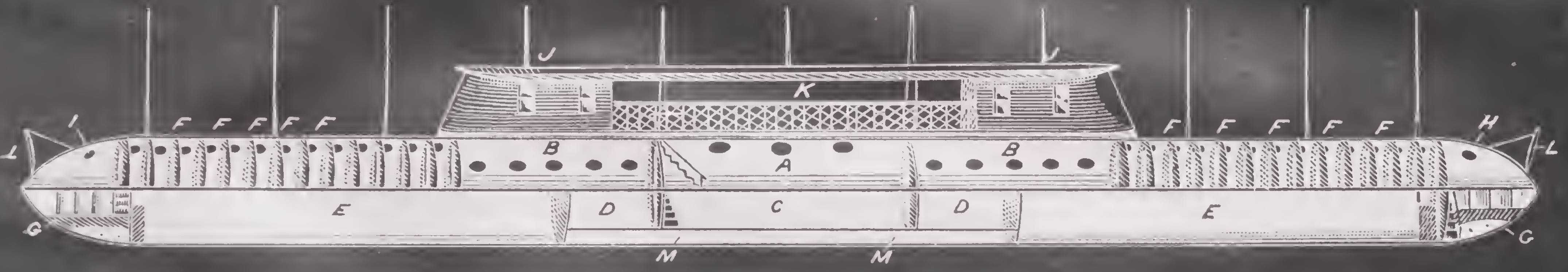
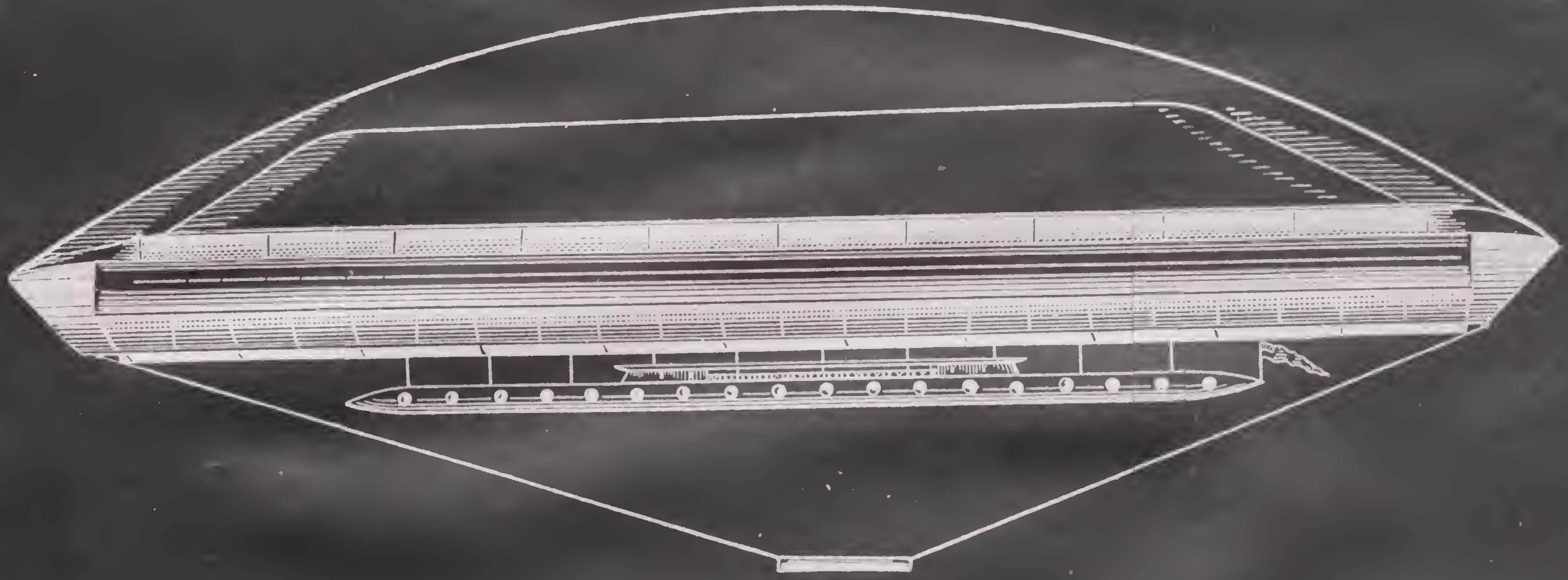
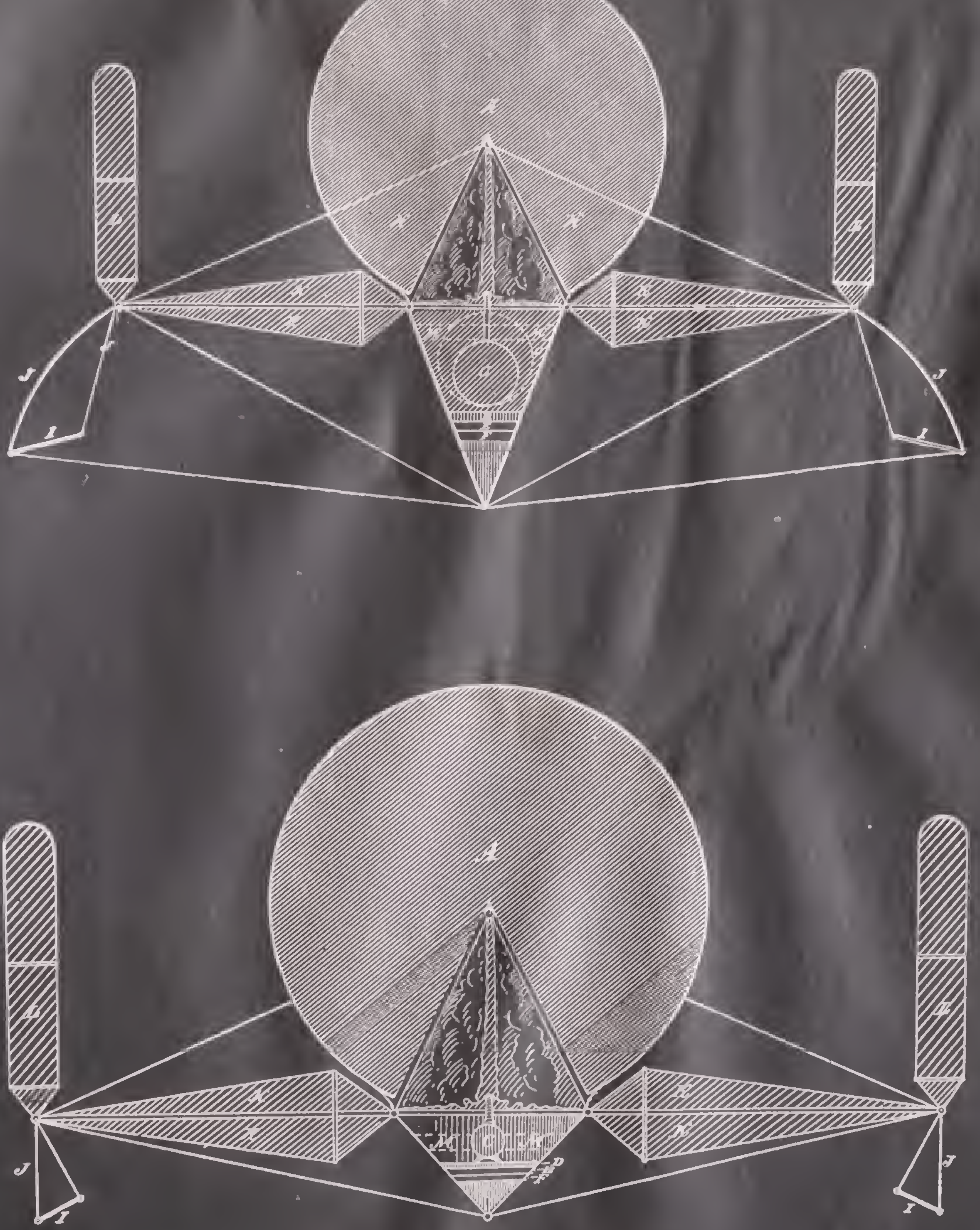


Fig. 6.



Modification of Fig. 1.



Modifications of Fig. 4.

Showing section of an Aerovolt with cylindrical centre chamber, and with passenger car as an integral part of the structure.

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